

## Impact of Exchange Rate on Stock Returns in Shenzhen Stock Exchange: Analysis Through ARDL Approach

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### Abstract

This research investigate the influence of exchange rate on the stock returns of Shenzhen stock exchange from January 2008 to December 2018 by utilizing ARDL model for checking the short run and the long run association between the study variables. The estimated ARDL results indicate that exchange rate has a negative and significant influence on the stock returns of Shenzhen stock exchange. Inflation and interest rate results indicate a negative and statistically significant effect on the stock returns. Based on the estimated results of this study it is recommended that the policy makers in Central bank needs to make such policies that helps to stabilize the exchange rate.

**Keywords:** Exchange Rate, Interest Rate, Inflation rate, Stock returns, ARDL.

### Introduction

The rate of foreign exchange has been among the major financial and economic factors affecting common stocks value and cash flows. The fluctuation of currency prices begun subsequently due to the drop of fixed exchange rates in 1970's (Rose, 2000). The adoption of the floating exchange rate regimes in many nations and rapid expansion of international trade has led to increased volatility of the exchange rates. Joseph (2002) indicated that exchange rate impact on both output and input price directly determine the value and international competitiveness of firms. The exchange rate fluctuation plays essential role in decision that investors will take in relation to taking up investment opportunities. This availability to evaluate risk has majorly been brought about by the fact that a decline in foreign exchange fluctuation usually leads to risky investment decisions (Muriu, 2003).

The significance of exchange rate is that it can be adjusted continuously relative to market force for foreign exchange in a given economy. It generates equilibrium between demand and supply by affecting exchange rate without influencing the reserve level. This allows a country to be flexible in the pursuit of monetary policy without being concerned about effects on the balance of payments. Exchange rate movements reflect external shocks and imbalances which do not have an effect on movement in reserves and does not need the intervention of the central bank to control the process of adjustment. By use of the flexed exchange rate system, pricing of currencies is hence a result of foreigner currencies market demand forces and supply forces (Ndungu, 2001). The yield that is obtainable by an investor in a quantified period which is occasionally well-thought-out as synonymous to prices of stock. A market is considered strong if it is one that integrates innovative facts on stock prices hence resulting to the stock prices valuation stability and accuracy Mwangi and Mwiti (2015).

The study on exchange rate volatility has drawn various studies with most of them concluding that fluctuations in the returns of stock continue to be directly interconnected with fluctuations in exchange rate. Fama (1970) stated that the returns of stock market are observed in terms of market effectiveness. Stock market effectiveness

relies on precision of macroeconomic variable information that causes the stock market returns. Lee (2010) revealed that the depreciation of the local currency could lead to improved stock performance since this depreciation could lead to cheaper exports hence more demand of commodities leading to increased cash flows and profits due to increased sales hence share price. Depreciation could also lead to increased interest cost on loans hence a reduction in cash flows and as a result share price demand. An increase in the stock market index will attract foreign investors to diversify shares in that stock market leading to investors demanding currency that helps in currency appreciation.

Empirical evidence is largely inconsistent and quite varied on volatility of foreign exchange rate influence on stock market returns. Benita and Lauterbach (2004) stated that fluctuations in exchange rate costs the economy in shape of high inflation, productivity cost and economic instability of a firm. Sekmen (2011) examined how exchange rate volatility affects United States' returns in stock and exposed that United States' stock returns are influenced negatively through exchange rate variations. Taiwo and Adesola (2013) studied exchange rates volatility and performance of Nigerian banks and found insignificant effect. Kolari et al. (2008) found stock returns said to be uncertain and to be very sensitive to foreign exchange risk. Pilinkus and Boguslauskas (2009) stated that exchange rate having association with stock returns in the short run.

The current study will seek to identify how exchange rates volatility influence stock market returns of Shenzhen stock exchange in short and long run. It will attempt to give an explanation to the research question, what is the influence of exchange rate volatility on stock market returns of Shenzhen stock exchange in short and long run? ARDL model is applied to check the influence of exchange rates fluctuation on stock market returns at the Shenzhen stock exchange. Previously researchers applied different cointegration methods to estimate the association between exchange rate and stock market returns Sekmen (2011), Taiwo and Adesola (2013), Kolari et al. (2008), Pilinkus and Boguslauskas (2009). ARDL approach is applied to check the short run and the long run association between the study variables. ARDL model was suggested by Pesaran et al. (1996) and Pesaran et al. (2001). ARDL model is applied for three main reasons: ARDL model can be applied with different lag for dependent and independent variables but other cointegration needs same order of lags. The ARDL technique can remove the problems related with omitted variables and auto-correlation. ARDL model can be applied with small sample size (Pesaran et al., 2001).

### **Literature Review**

Karolyi (2001) asserts that as globalization and economic integration increases every year, both the financial and non- financial firms use exchange rate movements to manage risks. Jumah (2013) opines that exchange-rate movements influence the corporate expected cash flows which intern influence stock returns, by changing foreign currency' home currency value denominated costs and revenues and the competition terms for firms and multinationals with international activities.

Pan et al. (2007) pointed out that constant rising fluctuations in stock prices are normally indicative of economic developments, which light growth of money as commercial banks respond to growing demand for supplementary loans. Growing money demand will consequently cause interest rates; interest rates that affect the domestic currency increase as well as capital inflows. This means that stock price changes may impact outflows and inflows capital, which consequently results in domestic currency changes in exchange rate.

Aggarwal (2003) shows that there exists a positive exchange rate change impact on the US stock market, while Solnik (2000) reveals that exchange rate fluctuations can considerably affect the values of firms, and the foreign currency value disparities in denominated assets. According to Bodnar and Gentry (1993) research on Japan, Canada and the US organization's stock exchange returns and exchange rate movements, findings of the research

show causality direction goes from rates of exchange to prices of stock.

Rey and Hau (2005) suggested that equity and foreign exchange performance bear a negative correlation due to portfolio rebalancing. This is based upon a viewpoint of a foreign institutional investor with the funds invested in the US. Investors in US stock market relative to the foreigners market are over weights their equities. To bring back their portfolio to a favorable position, they sell and reduce their holding of US stocks and sell the US dollar for local currency. Selling of dollars leads the dollar to depreciate at the same time that American equities are outperforming other markets Melvin and Prins (2015).

Omondi and Olweny (2011) carried out a study on foreign exchange and stock returns and found that there was a low and significant magnitude of volatility. Chirchir (2011) investigated the association of foreign exchange rates with share prices in Kenya; they found out that exchange rates have an influence on share prices in the Kenyan market. Ambunya (2012) interrogated how exchange rate movement relates with the stock market returns volatility at the NSE between January 2007 and December 2011. The results revealed that a strong correlation among stock returns and exchange rate.

Fama (1965) stated that stock prices are very sensitive to information. Efficient market hypothesis being the backbone of financial markets, it has a fair share of critics. The main point of contention being that the EMH assumes that investors are very sensible to information while doing investment in stock market. These expectations beat the point of trading after all given that trade signals existence of heterogeneous expectations. While the seller expects a dip, the buyer anticipates a rise in the stock price, and hence bears and bulls. Also, it is not practical for all market participants to have the same information; if it were so, there would be no need for communication. This theory is related to this study in that if markets are efficient, then exchange rate volatility should be immediately returned in stock returns and so stockholders would not beat the market.

The Purchasing Power Parity (PPP) examines the correlation between the rates of exchange of diverse countries in 1920 by the Swedish economist Cassel. The PPP theorem proposes that during a regime of floating exchange rate, whichever purchasing power parity modification for two currency considered as a ratio of price for goods traded would incline to approximation by an equivalent but contrasting equilibrium change in exchange rate of these two currencies rates move to offset the inflation rate differentials. The PPP asserts that the rate of exchange of two currencies must be alike to the price level ratio of undistinguishable services and goods in these countries. The Purchasing Power Parity theorem expounds connection of exchange rates with comparative good's prices (Imbs et al., 2003).

PPP theorem can be drawn in past in Spain to sixteen-century, though Swedish economist Cassel named the theory PPP first. Cassel at one point argued that in deficit of it, all the ways would be meaningless in discussing a currency mispricing. Absolute PPP theory was presented first with aim of dealing with the good's price relationship with different currencies value Dwivedi (2002). Nevertheless, in actual society impractical assumption that no transport costs of goods are needed to facilitate mobility. In the real world, every economy yields and guzzles thousands of commodities and services in tens, numerous having unlike prices from country to Kanamori et al. (2006).

International Fisher Effect (IFE) is an exchange rate framework established by Irving Fisher in the 1930s. This theory implies that fluctuations in the rate of exchange between states are derived from differences in their nominal interest rates. Differences in nominal rates between nations will results to a currency rise of the state with the lower nominal rate. The rationale being that the nation having rate of interest higher regime will similarly have price index which is higher, causing currency depreciation in the high interest economy vis-a-vis the nation experiencing a lower interest rate level.

Fisher (1930) revealed that the nominal return expected on a share includes a real return rate plus the inflation

rate expected. Additionally, the study stated that negative and unfavorable correlation exists between the stock return and inflation which is expected together with variation in unexpected inflation Kaul (1987). Gultekin (1983) tested the Fisher hypothesis using a sample of 26 countries. The results of his time series analysis were unfavorable compared to the Fisher Hypothesis, while the cross-sectional study revealed that nations with increased rates of inflation often had high nominal returns on shares and in this case contrasted the results of the time series.

Fama and Schwert (2003) revealed that a perfect market that analyzed and reflected the information available at a particular time  $t-1$ , then this would incorporate the precedence of the price of common shares such that the nominal return expected from  $t-1$  to  $t$  would be the same as the total of the required equilibrium that would be anticipated by real rate and the particular assessment of the market's rate of inflation expected for a similar period of time investors usually reduce their investment from financial assets and increase their real assets when it is anticipated that the inflation rate would increase. Hence, according to the research and analysis by Fama the equities normally represent claims to real assets and hence act as hedges against the inflation, which therefore suggests that the expected inflation rate is correlated to a positive stock price and appreciation in stock price (Dimand, 2003).

Exchange rate volatility may have effect on the relative prices, thus the local and foreign producer's competitiveness. An increase in the local currency results to increase the prices of related goods and services imported from other countries. Appreciation of currency in circumstances of an export-oriented country, it is anticipated that there will be competitiveness a reduction in exports causing an impact influencing negatively the stock market domestically Kirui et al. (2014). Tucker (2007) stated that inflation is the increase in the standard price levels of services or goods in any given economy. Inflation is referred to as an overall increase in the average level of prices and not specifically in relation to a unit of a given product or service.

Dwivedi (2002) blames the foreign exchange volatility on high technological levels in the developed nations. He argued that the industrialized produced a lot of surplus commodities which increased their export volumes their foreign currency's supply in the domestic countries leading to the currency depreciation; thus increased the exports commodities prices and a subsequent reduction in value. Some currencies are perceived to be more risky than others, especially those in the developing nations. A flight to safety occurs when the fundamentals of the global economy are suspicious. Flight to safety is a situation whereby the investors only hold safe investments and avoid riskier investments. Sloman (2007) stated that inflation could take the form of either demand pull inflation which is brought about by increase in demand of goods or the form of cost push inflation. Demand-pull inflation arises as a result of a general rise in the market demand in general which results to higher prices and partially increases of the output in a given economy.

### **Methodology**

The data were collected from a secondary source. Monthly data for ten years (January 2008 to December 2018) was collected and analyzed. The data distribution decided was on monthly to guarantee an acceptable quantity of observations. As the study was to focus on the Shenzhen A stock index (SZSE A Share Index), the research included all the companies that have been used to determine the index for the period between January 2008 and December 2018 were obtained from yahoo finance. Data for the independent variables; exchange rate, Interest rate and the inflation data were gathered from the Federal Reserve Bank of ST. Louis. The study analyzed the SZSE A Share Index as it related to the quoted companies that are considered blue chip and have superior profitability and dividend indicated in the stock return.

ARDL approach is applied to check the short run and the long run association between the study variables.

ARDL model was proposed by Pesaran et al. (1996) and subsequently it was modified by Pesaran, Shin and Smith (2001) by introducing the bounds testing approach. ARDL model is applied for three main reasons: ARDL model can be applied with different lag for dependent and independent variables but other cointegration needs same order of lags. The ARDL technique can remove the problems related with omitted variables and auto-correlation. ARDL model can be applied with small sample size (Pesaran et al., 2001). The equation of the cointegration is written as follows:

$$\Delta SZSER_t = \beta_0 + \beta_1 \sum_{i=1}^t \Delta SZSER_t + \beta_2 \sum_{i=1}^t \Delta USD/RMB_t + \beta_3 \sum_{i=1}^t \Delta CHINF_t + \beta_4 \sum_{i=1}^t \Delta CHINT_t + \gamma_1 SZSER_{t-i} + \gamma_2 USD/RMB_{t-i} + \gamma_3 CHINF_{t-i} + \gamma_4 CHINT_{t-i} + \varepsilon_t$$

In the above equation  $\beta_0$  is the constant term, SZSER is the Shenzhen stock exchange A index returns, USD/RMB is exchange rate of one USD to RMB, CHINF is the China Inflation rate, CHINT is the China Interest rate and  $\varepsilon_t$  is the error term. Cointegration exist if the calculated F statistics value is greater than the upper bound value, no Cointegration if the calculated F statistics value is less than the lower bound value and if the calculated F statistics value is between the lower and the upper bound so the decision is inconclusive. The following is the null and the alternative hypothesis of cointegration model.  $H_0 = \gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = 0$  and  $H_0 \neq \gamma_1 \neq \gamma_2 \neq \gamma_3 \neq \gamma_4 \neq 0$ . If the estimated results pointed out the long run association among the study variables therefore the long run elasticities were applied by utilizing the following ARDL model:

$$\Delta SZSER_t = \beta_0 + \beta_1 \sum_{i=1}^t \Delta SZSER_t + \beta_2 \sum_{i=1}^t \Delta USD/RMB_t + \beta_3 \sum_{i=1}^t \Delta CHINF_t + \beta_4 \sum_{i=1}^t \Delta CHINT_t + \varepsilon_t$$

In the above equation  $\beta_1$  to  $\beta_4$  indicated the long run association among the study variables by using Akaike information criterion (AIC) for selecting suitable lag for dependent and independent variables. For short run ARDL model we applied the following error correction model.

$$\Delta SZSER_t = \beta_0 + \varphi_1 \sum_{i=1}^t \Delta SZSER_t + \varphi_2 \sum_{i=1}^t \Delta USD/RMB_t + \varphi_3 \sum_{i=1}^t \Delta CHINF_t + \varphi_4 \sum_{i=1}^t \Delta CHINT_t + \delta ECT_{t-1} + \varepsilon_t$$

In the above equation  $\varphi_1$  to  $\varphi_4$  indicates the short run association among the study variables while  $ECT_{t-1}$  indicates the speed of adjustment toward stability and  $\delta$  measure the speed of adjustment. Additionally we checked the correlation and heteroscedasticity through Breusch-Godfrey Serial Correlation LM Test and Breusch-Pagan-Godfrey test respectively while the stability of coefficients was checked through CUSUM and CUSUM square. Stationarity of each variable was checked through ADF and PP respectively.

## Results and Discussion

**Table 1: Unit Root Test**

Variables	ADF		Phillips-Perron	
	Intercept	Trend & Intercept	Intercept	Trend & Intercept
SZSER	-10.5280***	-10.4900***	-10.5706***	-10.5350***
$\Delta$ SZSER	-8.4532***	-8.5151***	-51.4159***	-57.6501***
USD/RMB	-2.2219	-1.8715	-2.2580	-1.6141
$\Delta$ USD/RMB	-6.2755***	-6.4850***	-6.1415***	-6.2098***
CHINF	-1.3140	-2.5887	-0.6993	-1.9261
$\Delta$ CHINF	-7.5456***	-7.5146***	-11.2772***	-11.2227***
CHINT	-2.9953*	-2.7704	-3.0478**	-2.8669
$\Delta$ CHINT	-9.4394***	-9.4792***	-9.4246***	-9.4450***

Table 1 indicates the results of ADF and PP respectively at intercept, trend and intercept at level and first difference. Estimated results indicated that all study variables are stationary at level and first difference except exchange rate. Exchange rate is stationary at first difference. The estimated results confirmed that none of the study variable is stationary at second difference.

**Table 2: Lag Length Section Criterion**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	297.5736	NA	1.03e-07	-4.735058	-4.644082	-4.698101
1	933.4507	1220.474	4.70e-12	-14.73308	-14.27819*	-14.54829
2	963.9355	56.54422*	3.72e-12*	-14.96670*	-14.14791	-14.63409*
3	975.8591	21.34715	3.98e-12	-14.90095	-13.71825	-14.42051
4	988.5483	21.89917	4.22e-12	-14.84755	-13.30095	-14.21929
5	997.4293	14.75393	4.76e-12	-14.73273	-12.82222	-13.95664
6	1007.840	16.62415	5.26e-12	-14.64259	-12.36817	-13.71866
7	1021.680	21.20506	5.51e-12	-14.60773	-11.96941	-13.53598
8	1036.037	21.07260	5.76e-12	-14.58124	-11.57900	-13.36166

Table 2 demonstrates the results of AIC, SIC and HIC for selecting suitable for ARDL model based on VAR model. AIC and HIC indicates that lag two is suitable for ARDL model but SIC indicate that lag one is suitable for ARDL model. We are using AIC lag length for selection of suitable lag because the AIC value is the lowest value as compared to other SIC and HIC. According to AIC lag two is the best lag for ARDL model.

**Table 3: ARDL Bounds Testing Approach**

Test Statistic	Value	k
F-statistic	32.29977	3
Critical Value Bounds		
Significance	I(0) Bound	I(1) Bound
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61



Table 3 demonstrates ARDL bound test results, which is used to check the long run association among the study variables. The calculated F-statistics value of bound test indicate that long run association exist among the study variables because the F-statistics value is greater than from the upper bound value at 5% level of significance.

**Table 4: ARDL Long Run Coefficients**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTEREST_RATE	-0.079811	0.024317	-3.282055	0.0013
INFLATION_RATE	-0.197921	0.111523	-1.774700	0.0784
EXCHANGE_RATE	-0.069429	0.029197	-2.377938	0.0190
C	1.604805	0.641239	2.502662	0.0136
R-squared			0.5185	
Akaike info criterion			-1.965011	
Schwarz criterion			-1.810605	
Durbin-Watson stat			2.026081	
F-statistic			22.07826	
Prob(F-statistic)			0.000000	
Breusch-Pagan-Godfrey			0.1873	
Breusch-Godfrey Serial Correlation LM Test			0.9463	

Table 4 indicates result of long run ARDL model. SZSER is Shenzhen Stock exchange A Index is used as dependent variable in this study while USD/RMB is the exchange rate of one USD into RMB, CHINF is the China inflation rate and CHINT is the China interest rate used as independent variables.

The estimated result demonstrates that interest rate has an adverse and significant influence on stock returns of Shenzhen stock exchange in long run. Interest rate demonstrates that 1% increase in interest rate negatively affects the stock returns and the stock returns decrease about 7.9 %. Interest rate is deliberated as cost for investment that decreases the profit of investors. Investors prefer to deposit there saving in banks as compared to invest in stock exchange. The estimated results are same previous researchers. The interest rate is an income function. Having key role of helping in mobilizing of financial resources and ensuring the resources utilization efficiency in the advancement of economic growth and development Willy (2012). Khan et al. (2017) stated that interest rate has negative influence on stock returns in China. The rate of interest can also be said to be the yearly worth charged by an investor to a debtor so as to secure a loan and is articulated frequently as the total amount loaned percentage Barnor (2014). Rehman et al. (2009) argue that rates of interest or discount rates that are high usually reduces the cash flows present value, opportunity cost of holding cash increases, interest rate negatively influence the stocks returns.

The estimated results of inflation rate indicate an adverse and significant influence on stock returns of Shenzhen stock exchange. The results indicate that stock returns are adversely influenced by a 1% increase in inflation rate; due to high inflation the stock returns drops about 20%. Inflation is the main component that causes to increase the prices of daily life goods and services that causes to decrease the investment power of investors. The estimated results are same with previous researchers. Cost push inflation is caused by the rise in the levels or cost of production which may affect the firms thus resulting in the companies charging the consumers more (Hendry, 2006). Higher inflation rates lead to higher prices for consumers which tend to slow business and reduce earnings for firms. Higher prices also tend to trigger a higher interest rate regime. Fama (1981) revealed that economic development is negatively influenced by inflation that adversely impact on the stock market

performance. High price levels in economy are adversely associated with the stock index.

The results of long run ARDL indicate that exchange rate has a negative and significant effect on stock returns in Shenzhen stock exchange. The estimated results indicated that 1% increase in exchange rate causes to decrease the stock returns about 6.9% because with increase in the exchange rate causes to decrease the value of domestic currency that effect the prices in local market. Tumwebaze (2011) investigated the association of export companies' profitability with exchange rate. The findings revealed that differentials in terms of trade, high levels of inflation and interest rates, cause exchange rate volatility. While profitability levels of a company are determined by the sales volume, export companies' profitability is normally determined by the foreign exchange volatility. This implies that profits are affected negatively by unfavorable volatility while positively affected by favorable volatility. Pal and Mittal (2011) conducted an analysis on the Indian Capital Markets and exchange rates relationship, inflation rate, gross domestic savings and interest rates of India economy. The results concluded that there was dependence relationship on indices of capital markets and rates of exchange, gross domestic savings, inflation and interest rates even though it may seem that they are not statistically significant in all the areas. Osamwonyi and Evbayiro-Osagie (2012) explored correlation between variables of macroeconomic nature and the Nigeria capital market index. It was concluded that there was an effect on the stock market index in Nigeria that was brought about by particular macroeconomic variables. Kuwornu (2012) revealed that no co-integration existed between the exchange rate, inflation, 91-day Treasury bill rate, crude oil prices and the Ghanaian stock returns thus indicating long run equilibrium associations. This pointed out that exchange rates adversely influence on stock market returns. Alexeev and Parlapiano (2013) indicate that the Yen has the maximum effect on of European firms' market value amongst the 20 currency pairs studied. The financial sector was also noted to be the most influenced. The impact was also noted to be greater for large capitalization firms and non-exporters. Ilahi et al. (2015) studied the association between stock market yields and exchange rate, rate of interest and rate of inflation and stock returns. The multiple linear regressions were adopted in the study for data analysis and there existed a weak relationship between the study variables. They pointed out that exchange rate have an adverse influence on the stock returns.

The last section of the table indicates different diagnostic statistics results. R-squared demonstrate that 51% variation in the dependent variable is caused by the study independent variables. AIC, HIC and SIC are applied to choice the suitable lag for ARDL model. The results AIC indicate that its value is the lowest as compared to HIC and SIC so we select the AIC to select appropriate lag for ARDL model. P value of F-statistics demonstrate that the model is fit. Results of Breusch-Pagan-Godfrey and Breusch-Godfrey Serial Correlation LM Test indicate that there is no problem of heteroskedasticity and serial correlation in the model. Durbin-Watson statistics results indicate that no problem of auto correlation exist in the model.

**Table 5: ARDL Short Run Coefficients**

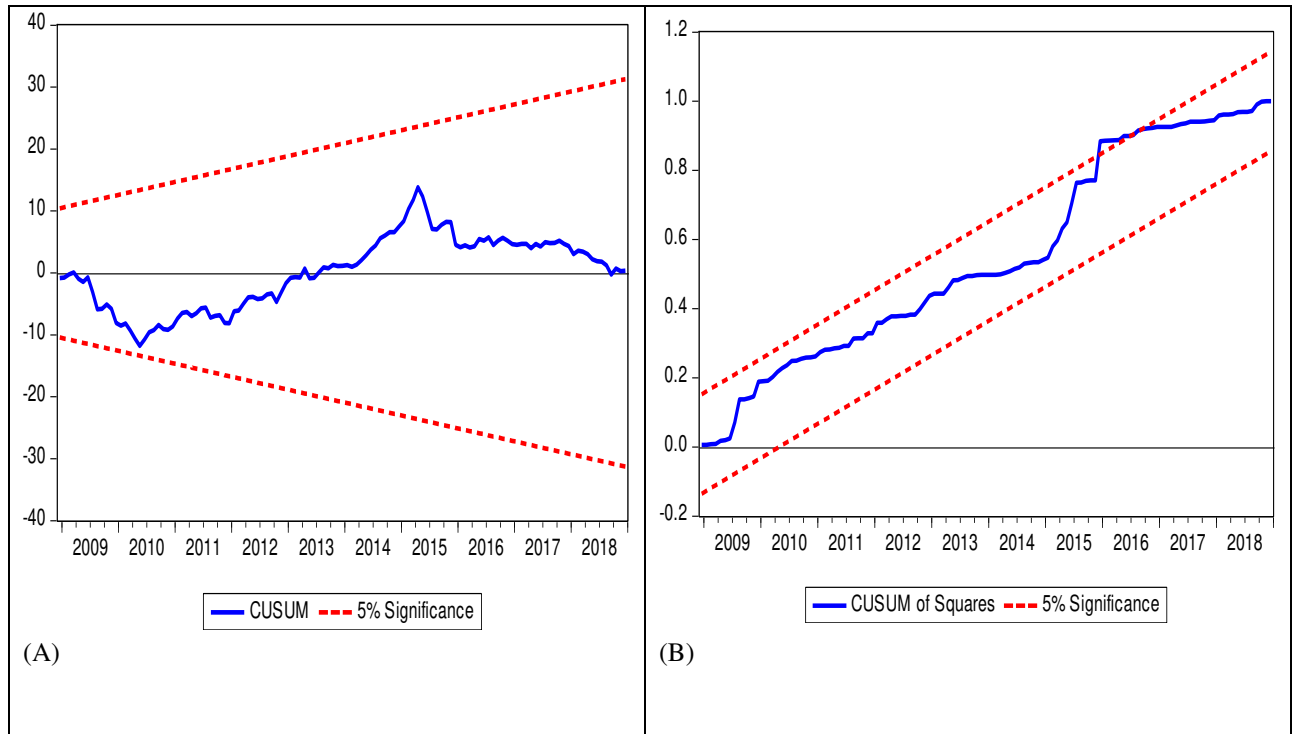
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INTEREST_RATE)	-0.084590	0.027918	-3.029974	0.0030
D(INFLATION_RATE)	-0.209771	0.119546	-1.754733	0.0818
D(EXCHANGE_RATE)	-0.461167	0.186593	-2.471518	0.0148
ECT(-1)	-0.598750	0.092689	-6.4597	0.0000

Table 5 shows that interest rate in the short run has an adverse and significant influence on the stock returns. Interest rate shows that 1% increase causes to decrease the stock returns about 8.5%. The results of inflation indicate an adverse and significant influence on the stock returns. Estimated results of inflation demonstrate that 1% increase in inflation in economy decrease the stock returns about 20%. Exchange rate indicates an adverse



and statistically significant influence on the stock returns. Results of exchange results demonstrate that 1% increase in exchange rate causes to decrease the stock returns about 46% because of devaluation in domestic currency.

Figure A and B



The above figures indicate the graph of CUSUM and CUSUM of squares respectively. Both figures show that coefficients of long run ARDL are stable at 5% level of significance.

### Conclusions and recommendation

The purpose of this study is to scrutinize the influence of exchange rate on stock returns of Shenzhen stock exchange for time period from January 2008 to December 2018 by applying auto regressive distributed lag (ARDL) model for checking long run and short run association between the study variables. Before applying ARDL model it is necessary to check the stationarity of each variable that none of the variables is stationary at second difference. Stationarity of each variable were checked through ADF and PP unit root tests respectively. Results of ADF and PP specify that none of the variable is not stationary at I(2). ARDL model have different advantages as compared to other co-integrations methods; one of the advantage is that ARDL model did not need the same lag length for dependent and independent variables. We have applied different lag length selection to choose suitable lag for dependent and independent variables. According to AIC results lag two is the suitable length for ARDL model. Different diagnostic statistics were utilized to examine the auto correlation and serial correlation in the model. The estimated results indicated no problem of auto correlation and serial correlation in the model. The estimated results of short run and long run ARDL model indicate that inflation rate, interest rate and exchange rate have negative and statistically significant effect on the stock returns of Shenzhen stock exchange. Based on the estimated results it is recommended that the policy makers need to stabilize the exchange rate by suitable polices for foreign currency. This is because their policies may affect the performance despite their good intention to correct the deteriorating situations in the economy. The monetary Committee needs to maintain a stable foreign currency exchange if the activities at the Stock exchange are to be promoted.

This is because huge exchange rate movements distort the trends of performance at the stock market leaving investors guessing the next cause of action because they may not be able to estimate with certainty the future state of the economy.

## References

1. Aggarwal, R. (2003). Exchange rates and stock prices: A study of the US capital markets under floating exchange rates.
2. Aizenman, J., & Lee, J. (2010). Real exchange rate, mercantilism and the learning by doing externality. *Pacific Economic Review*, 15(3), 324-335.
3. Ambunya, P. L. (2012). The relationship between exchange rate movement and stock market returns volatility at the Nairobi Securities Exchange. *Masters of Business Administration (MBA) project School of Business, University of Nairobi*.
4. Barnor, C. (2014). The effect of macroeconomic variables on stock market returns in Ghana (2000-2013).
5. Benita, G., & Lauterbach, B. (2004). Policy Factors and Exchange Rate Volatility: Panel Data Verses a Specific Country Analysis, Research Unit. *Foreign Exchange Activity Department, Bank of Israel, Jerusalem*.
6. Bodnar, G. M., & Gentry, W. M. (1993). Exchange rate exposure and industry characteristics: evidence from Canada, Japan, and the USA. *Journal of international Money and Finance*, 12(1), 29-45.
7. Chirchir, D. K. (2011). The relationship between share prices and exchange rates: Evidence from Kenya. *Unpublished MBA thesis. Nairobi: University of Nairobi*.
8. Dimand, R. W. (2003). Irving Fisher on the international transmission of booms and depressions through monetary standards. *Journal of money, credit and banking*, 49-90.
9. Dwivedi, M. (2002). Exchange Rate Economics: What's Wrong with the Conventional Macro Approach?'
10. Fama, E. F. (1965). The behavior of stock-market prices. *The journal of Business*, 38(1), 34-105.
11. Fama, E. F. (1981). Stock returns, real activity, inflation, and money. *The American economic review*, 71(4), 545-565.
12. Fisher, I. (1930). *The Theory of Interest* (New York: Augustus M. Kelley, Publishers, 1965). *Reprinted from the*.
13. Frankel, J. A., & Rose, A. K. (2000). *Estimating the effect of currency unions on trade and output* (No. w7857). National Bureau of Economic Research.
14. Hau, H., & Rey, H. (2005). Exchange rates, equity prices, and capital flows. *The Review of Financial Studies*, 19(1), 273-317.
15. Hendry, D. F. (2001). Modelling UK inflation, 1875–1991. *Journal of applied econometrics*, 16(3), 255-275.
16. Ilahi, I., Ali, M., & Jamil, R. A. (2015). Impact of macroeconomic variables on stock market returns: A case of Karachi stock exchange. *Available at SSRN 2583401*.
17. Imbs, J., Mumtaz, H., Ravn, M. O., & Rey, H. (2003). Nonlinearities and real exchange rate dynamics. *Journal of the European Economic Association*, 1(2-3), 639-649.
18. Joseph, N. L. (2002). Modelling the impacts of interest rate and exchange rate changes on UK stock returns. *Derivatives Use, Trading & Regulation*, 7(4), 306-306.
19. Jumah, I. M. (2013). Effects Of Foreign Exchange Rate Fluctuation On Stock Returns Volatility: A Case Study Of Nairobi Securities Exchange (NSE) 1996-2012. *Unpublished Doctoral Dissertation: University Of Nairobi*.
20. Kanamori, T., Zhao, Z., & Asian Development Bank Institute. (2006). *The renminbi exchange rate revaluation: Theory, practice and lessons from Japan* (No. 9). Asian Development Bank Institute.

- 21.Karolyi, G. A. (2001). Why Stock Return Volatility Really Matters. Prepared for Inaugural Issue of Strategic Investor Relations. *published by Institutional Investor Journals Series*.
- 22.Kaul, G. (1987). Stock returns and inflation: The role of the monetary sector. *Journal of financial economics*, 18(2), 253-276.
- 23.Khan, M. K., Teng, J. Z., Parvaiz, J., & Chaudhary, S. K. (2017). Nexuses between Economic Factors and Stock Returns in China. *International Journal of Economics and Finance*, 9(9).
- 24.Kirui, E., Wawire, N. H., & Onono, P. O. (2014). Macroeconomic variables, volatility and stock market returns: a case of Nairobi securities exchange, Kenya. *International Journal of Economics and Finance*, 6(8), 214-228.
- 25.Kolari, J. W., Moorman, T. C., & Sorescu, S. M. (2008). Foreign exchange risk and the cross-section of stock returns. *Journal of International Money and Finance*, 27(7), 1074-1097.
- 26.Kuwornu, J. K. (2012). Effect of macroeconomic variables on the ghanaian stock market returns: A co-integration analysis.
- 27.Malkiel, B. G., & Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The journal of Finance*, 25(2), 383-417.
- 28.Melvin, M., & Prins, J. (2015). Equity hedging and exchange rates at the London 4 pm fix. *Journal of Financial Markets*, 22, 50-72.
- 29.Muriu, P.W. (2003). *Volatility of stock returns -an empirical analysis of NSE*. Unpublished MA Thesis: University of Nairobi.
- 30.Mwangi, M., & Mwit, J. K. (2015). The effect of voluntary disclosure on stock market returns of companies listed at the Nairobi securities exchange. *International Journal of Business and Social Science*, 6(1).
- 31.Ndung'u, N. S. (2001). *Liberalization of the foreign exchange market in Kenya and the short-term capital flows problem*. AERC.
- 32.Olweny, T., & Omondi, K. (2011). The effect of macro-economic factors on stock return volatility in the Nairobi stock exchange, Kenya. *Economics and Finance review*, 1(10), 34-48.
- 33.Osamwonyi, I. O., & Evbayiro-Osagie, E. I. (2012). The relationship between macroeconomic variables and stock market index in Nigeria. *Journal of Economics*, 3(1), 55-63.
- 34.Pal, K., & Mittal, R. (2011). Impact of macroeconomic indicators on Indian capital markets. *The Journal of Risk Finance*, 12(2), 84-97.
- 35.Pan, M. S., Fok, R. C. W., & Liu, Y. A. (2007). Dynamic linkages between exchange rates and stock prices: Evidence from East Asian markets. *International Review of Economics & Finance*, 16(4), 503-520.
- 36.Parlapiano, F., & Alexeev, V. (2013). M&A Announcements in Australia and Their Impact on Competitors.
- 37.Pesaran, M. H., & Shin, Y. (1996). Cointegration and speed of convergence to equilibrium. *Journal of econometrics*, 71(1-2), 117-143.
- 38.Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, 16(3), 289-326.
- 39.Pilinkus, D., & Boguslauskas, V. (2009). The short-run relationship between stock market prices and macroeconomic variables in Lithuania: an application of the impulse response function. *Engineering Economics*, 65(5).
- 40.Rahman, A. A., Sidek, N. Z. M., & Tafri, F. H. (2009). Macroeconomic determinants of Malaysian stock market. *African Journal of Business Management*, 3(3), 095-106.
- 41.Schwert, G. W. (2003). Anomalies and market efficiency. *Handbook of the Economics of Finance*, 1, 939-974.
- 42.Sekmen, F. (2011). Exchange Rate Volatility and Stock Returns for the United States. Adapazari: Sakarya

University.

- 43.Sloman, J. (2007). *Economics and the business environment*. Pearson Education.
- 44.Solnik, B. (1987). Using financial prices to test exchange rate models: A note. *The journal of Finance*, 42(1), 141-149.
- 45.Taiwo, O., & Adesola, O. A. (2013). Exchange rate volatility and bank performance in Nigeria. *Asian Economic and Financial Review*, 3(2), 178.
- 46.Tucker, J. W. (2007). Is openness penalized? Stock returns around earnings warnings. *The Accounting Review*, 82(4), 1055-1087.
- 47.Tumwebaze, D. M. (2011). Foreign Exchange Volatility and Profitability Of Export Companies, A Case Of Maiyre Estate Limited. *MBA Project*.
- 48.Wang F. (2012). *Determinants of Chinese Stock Market Returns*. Unpublished MSc Thesis. Universiti Utara Malaysia
- 49.Willy, O. C. O. (2012). Macroeconomic fluctuations effects on the financial performance of listed manufacturing firms in Kenya.